```
=> fil wpix
FILE 'WPIX' ENTERED AT 14:26:06 ON 26 APR 2007
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FILE LAST UPDATED:                          23 APR 2007   <20070423/UP>
MOST RECENT THOMSON SCIENTIFIC UPDATE:      200726        <200726/DW>
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>>> FOR DETAILS ON THE NEW AND ENHANCED DERWENT WORLD PATENTS INDEX
    PLEASE SEE
http://www.stn-international.de/stndatabases/details/dwpi_r.html <<<

=> d his nofile

     (FILE 'HOME' ENTERED AT 12:06:22 ON 26 APR 2007)

     FILE 'HCAPLUS' ENTERED AT 12:06:32 ON 26 APR 2007
L1             1 SEA ABB=ON  PLU=ON  US2004081889/PN

     FILE 'REGISTRY' ENTERED AT 12:07:19 ON 26 APR 2007
L2            32 SEA ABB=ON  PLU=ON  (7704-34-9/BI OR 114239-80-4/BI OR

L3             1 SEA ABB=ON  PLU=ON  7439-93-2/RN

     FILE 'HCAPLUS' ENTERED AT 12:52:30 ON 26 APR 2007
L4               QUE ABB=ON  PLU=ON  NEGATIVE?(A)ELECTROD## OR ANOD##
L5               QUE ABB=ON  PLU=ON  (LITHIUM OR LI)(2A)BATTERY
L6               QUE ABB=ON  PLU=ON  SUBSTRAT? OR SURFACE? OR BASE# OR
                 SUBSTRUCT? OR PANE? OR DISK? OR DISC# OR WAFER?
L7               QUE ABB=ON  PLU=ON  ROUGH?
L8               QUE ABB=ON  PLU=ON  ANGSTROM?
L9           19073 SEA ABB=ON  PLU=ON  L4 AND L5
L10           6561 SEA ABB=ON  PLU=ON  L9 AND L6
L11           3262 SEA ABB=ON  PLU=ON  L7(3A)(20 OR 30 OR 40 OR 3000 OR
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              3500 OR 4000 OR 5000)
L12       22045 SEA ABB=ON  PLU=ON  (L3 OR LI OR LITHIUM)(L)L4
L13        4384 SEA ABB=ON  PLU=ON  (LI OR LITHIUM)(3A)LAYER?
L14             QUE ABB=ON  PLU=ON  CURRENT?(2A)COLLECT?
L15       79419 SEA ABB=ON  PLU=ON  (L6 OR L14)(3A)L7
L16         114 SEA ABB=ON  PLU=ON  L10 AND L15
L17           3 SEA ABB=ON  PLU=ON  L16 AND L11
L18           0 SEA ABB=ON  PLU=ON  L17 AND L8
L19         554 SEA ABB=ON  PLU=ON  L13(3A)(L6 OR L14)
L20           7 SEA ABB=ON  PLU=ON  L19 AND L7
L21             QUE ABB=ON  PLU=ON  FILM?(3A)(POLYM? OR COPOLYM? OR
                RESIN?)
L22             QUE ABB=ON  PLU=ON  POLYESTER? OR POLYOLEFIN? OR
                POLYAMIDE? OR POLYCARBONATE? OR POLYACRYLATE? OR
                POLYACRYLIC?
L23          29 SEA ABB=ON  PLU=ON  L19 AND (L21 OR L22)
L24          14 SEA ABB=ON  PLU=ON  L23 AND L21
L25          18 SEA ABB=ON  PLU=ON  (L23 OR L24) AND L5
L26          12 SEA ABB=ON  PLU=ON  L25 AND L4
L27          19 SEA ABB=ON  PLU=ON  L17 OR L20 OR L26
L28          10 SEA ABB=ON  PLU=ON  L27 NOT (L17 OR L20)
L29           2 SEA ABB=ON  PLU=ON  L17 AND (L21 OR L22)
L30           9 SEA ABB=ON  PLU=ON  L29 OR L17 OR L20

     FILE 'WPIX' ENTERED AT 14:14:23 ON 26 APR 2007
L31          54 SEA ABB=ON  PLU=ON  L4 AND L5 AND L15
L32           4 SEA ABB=ON  PLU=ON  L31 AND L11
L33           2 SEA ABB=ON  PLU=ON  L32 AND (L21 OR L22)
L34           4 SEA ABB=ON  PLU=ON  L32 OR L33

     FILE 'COMPENDEX' ENTERED AT 14:17:30 ON 26 APR 2007
L35          23 SEA ABB=ON  PLU=ON  L4 AND L5 AND L15
L36           0 SEA ABB=ON  PLU=ON  L35 AND L11
L37           0 SEA ABB=ON  PLU=ON  L35 AND (L21 OR L22)

     FILE 'JAPIO' ENTERED AT 14:19:12 ON 26 APR 2007
L38          21 SEA ABB=ON  PLU=ON  L4 AND L5 AND L15
L39           2 SEA ABB=ON  PLU=ON  L38 AND L11
                D SCA

     FILE 'INSPEC' ENTERED AT 14:20:10 ON 26 APR 2007
L40          15 SEA ABB=ON  PLU=ON  L4 AND L5 AND L15
L41           1 SEA ABB=ON  PLU=ON  L40 AND L11
                D SCA
L42       44537 SEA ABB=ON  PLU=ON  (L6 OR L14)(3A)L7
L43          15 SEA ABB=ON  PLU=ON  L42 AND L4 AND L5
L44           1 SEA ABB=ON  PLU=ON  (L40 OR L43) AND (L21 OR L22)
L45           2 SEA ABB=ON  PLU=ON  L41 OR L44

     FILE 'WPIX' ENTERED AT 14:23:44 ON 26 APR 2007
                SEL L34 PN,APPS

     FILE 'HCAPLUS' ENTERED AT 14:24:23 ON 26 APR 2007
L46           3 SEA ABB=ON  PLU=ON  (KR2002-65483/APPS OR KR2005-16541/AP
                PS OR JP2002-158248/APPS OR CN1492529/PN OR CN2003-145389
                /APPS OR EP1416573/PN OR EP2003-90199/APPS OR JP11195410/
                PN OR JP1997-293846/APPS OR JP1998-304861/APPS OR
                JP2003-164281/APPS OR JP2003346789/PN OR JP2004146348/PN
                OR KR2004036438/PN OR KR2005039774/PN OR KR485091/PN OR
                KR551069/PN OR US2003-603777/APPS OR US20040081889/PN)
```

L47 7 SEA ABB=ON PLU=ON L30 NOT L46

FILE 'HCAPLUS, JAPIO, INSPEC' ENTERED AT 14:24:57 ON 26 APR 2007
L48 11 DUP REM L47 L39 L45 (0 DUPLICATES REMOVED)

=> d l34 ifull 1-4

L34 ANSWER 1 OF 4 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2006-370931 [38] WPIX
DOC. NO. CPI: C2006-119567 [38]
TITLE: **Anode** for **lithium** secondary **battery** comprises substrate consisting of metal foil or metal film having specified average **surface roughness**, and a lithium layer coated on the substrate
DERWENT CLASS: L03; X16
INVENTOR: CHO C K; LEE J W
PATENT ASSIGNEE: (SMSU-C) SAMSUNG SDI CO LTD
COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
KR 2005039774	A	20050429	(200638)*	KO	[1]	
KR 551069	B1	20060209	(200703)	KO		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
KR 2005039774	A	KR 2005-16541	20050228
KR 551069	B1	KR 2005-16541	20050228

FILING DETAILS:

PATENT NO	KIND		PATENT NO	
KR 551069	B1	Previous Publ	KR 2005039774	A

PRIORITY APPLN. INFO: KR 2005-16541 20050228
INT. PATENT CLASSIF.:
MAIN: H01M004-64
SECONDARY: H01M002-02
IPC ORIGINAL: H01M0002-02 [I,A]; H01M0004-64 [I,A]
BASIC ABSTRACT:
KR 2005039774 A UPAB: 20060616
NOVELTY - Provided is a **lithium** secondary **battery anode** that has a controlled range of average **surface roughness** on its **substrate**, to improve the life span of a **lithium** secondary **battery** using the **anode**
DETAILED DESCRIPTION - The **anode** (10) for a **lithium** secondary **battery** comprises a substrate (20) consisting of metal foil or metal film having an average **surface roughness** of **30**-3200 Angstroms; and a lithium layer (30) coated on the substrate (20). Particularly, the substrate is formed of a conductive material. The **lithium** secondary **battery** comprises the **anode** and a cathode comprising at least one cathode active material selected from the group consisting of lithium-containing metal oxides, lithium-containing chalcogenide compounds, sulfur-based materials, and conductive polymers.
FILE SEGMENT: CPI; EPI

MANUAL CODE: CPI: L03-E01B8; L03-E01B9A; L03-E03
EPI: X16-E01A1; X16-E01C; X16-E01C1; X16-E01E; X16-E02; X16-E08A

L34 ANSWER 2 OF 4 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2004-388212 [36] WPIX
DOC. NO. CPI: C2004-145299 [36]
DOC. NO. NON-CPI: N2004-309071 [36]
TITLE: **Negative electrode** for **lithium** secondary **battery** used in portable electronic instruments, includes substrate, and lithium layer coated on substrate
DERWENT CLASS: A85; L03; X16
INVENTOR: CHO C; CHO C K; CHO J G; LEE J; LEE J W
PATENT ASSIGNEE: (SMSU-C) SAMSUNG DENKAN KK; (SMSU-C) SAMSUNG SDI CO LTD
COUNTRY COUNT: 35

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20040081889	A1	20040429	(200436)*	EN	10[4]	
EP 1416573	A2	20040506	(200436)	EN		
JP 2004146348	A	20040520	(200436)	JA	12	
CN 1492529	A	20040428	(200446)	ZH		
KR 2004036438	A	20040430	(200456)	KO		
KR 485091	B	20050422	(200655)	KO		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION DATE
US 20040081889	A1	US 2003-603777 20030626
KR 2004036438	A	KR 2002-65483 20021025
JP 2004146348	A	JP 2003-164281 20030609
EP 1416573	A2	EP 2003-90199 20030704
CN 1492529	A	CN 2003-145389 20030707
KR 485091	B	KR 2002-65483 20021025

FILING DETAILS:

PATENT NO	KIND		PATENT NO	
KR 485091	B	Previous Publ	KR 2004036438	A

PRIORITY APPLN. INFO: KR 2002-65483 20021025
INT. PATENT CLASSIF.:
MAIN: H01M004-36
IPC RECLASSIF.: H01M0010-36 [I,A]; H01M0010-36 [I,C]; H01M0010-40 [I,A]; H01M0002-02 [N,A]; H01M0002-02 [N,C]; H01M0002-16 [I,A]; H01M0002-16 [I,C]; H01M0004-02 [I,A]; H01M0004-02 [I,C]; H01M0004-04 [I,A]; H01M0004-04 [I,C]; H01M0004-36 [I,C]; H01M0004-48 [N,A]; H01M0004-48 [N,C]; H01M0004-58 [I,A]; H01M0004-58 [I,C]; H01M0004-60 [I,A]; H01M0004-62 [N,A]; H01M0004-62 [N,C]; H01M0004-64 [I,A]; H01M0004-64 [I,C]; H01M0004-66 [I,A]; H01M0004-66 [I,C]

BASIC ABSTRACT:

US 20040081889 A1 UPAB: 20050529

NOVELTY - A **negative electrode** (10) for a **lithium** secondary **battery**, comprises a substrate (**20**) having a mean **roughness** of **30**-4000Angstrom; and a lithium layer (30) coated on the substrate.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a **lithium** secondary **battery** comprising a **negative electrode** of the invention; and a positive electrode comprising positive active material(s) from lithium-included metal oxide, a lithium-included chalcogenide compound, a sulfur-based material, or a conductive polymer.

USE - For a **lithium** secondary **battery** (claimed) used in portable electronic instruments.

ADVANTAGE - The inventive **negative electrode** can provide a **lithium** secondary **battery** with improved cycle-life characteristics. DESCRIPTION OF DRAWINGS - The figure is a cross-sectional drawing of a **negative electrode** of the invention.

Negative electrode (10)

Substrate (20)

Lithium layer (30)

TECHNOLOGY FOCUS:

ELECTRICAL POWER AND ENERGY - Preferred Component: A separator is interposed between the positive and **negative electrodes**. An electrolyte is also included which is non-aqueous or solid electrolyte. Preferred Material: The substrate for the **negative electrode** comprises a conductive material. Preferred Property: The mean **roughness** of the **substrate** is 30-3000, preferably 30-100Angstrom.

POLYMERS - Preferred Material: The substrate is a metal foil, a metal **film**, a conductive **polymer film**, a **polymer film** deposited with metal, or a **polymer film** incorporated with a conductive agent. The conductive **polymer film** is polyacetylene, polypyrrole, polyaniline, polythiophene, poly(p-phenylene), poly(phenylene vinylene), polyazulene, polyperinaphthalene, polyacene, or polynaphthalene-2,6-diyl. The **polymer film** deposited with metal is a **polymer film** from **polyester**, **polyolefin**, **polyamide**, poly(vinylidene fluoride), poly(tetrafluoroethylene), polystyrene, poly(acrylonitrile), poly(vinyl chloride), **polycarbonate**, **polyacrylate**, and/or their **copolymers**. The **polymer film** incorporated with the conductive agent is a **polymer film** from **polyester**, **polyolefin**, **polyamide**, poly(vinylidene fluoride), poly(tetrafluoro ethylene), polystyrene, poly(acrylonitrile), poly(vinyl chloride), **polycarbonate**, **polyacrylate**, and/or their copolymers. The **polyester** is poly(ethylene terephthalate), poly(butylene terephthalate), and/or their copolymers. The **polyolefin** is polyethylene, polypropylene, and/or their copolymers. The **polyamide** is nylon and/or their copolymers. The **polyacrylate** is poly(methyl methacrylate) and/or their copolymers. The separator is made of a polyethylene, polypropylene, or polyvinylidene fluoride separator, a polyethylene/polypropylene two-layered separator, a polyethylene/polypropylene/polyethylene three-layered separator, or a polypropylene/polyethylene/polypropylene three-layered separator. Preferred Property: The mean roughness of **polymer film** deposited with metal is 30-3500, preferably 30-100Angstrom.

INORGANIC CHEMISTRY - Preferred Material: The metal is copper or nickel. The conductive agent is a conductive metal oxide, a metal, or a carbonaceous material. It is also tin oxide, tin

phosphate, titanium oxide, a perovskite material, tin, copper, nickel, graphite, or carbon black. The lithium layer is prepared by depositing lithium on the substrate or by compressing a lithium foil. Preferred Component: The lithium-included metal oxide or lithium-included chalcogenide compound is compound(s) of formulae LixMn1-yMyA2 (1), LixMn1-yMyO2-zXz (2), LixMn2O4-zXz (3), LixMn2-yMyA4 (4), LixCo1-yMyA2 (5), LixCo1-yO2-zXz (6), LixNi1-yMyA2 (7), LixNi1-yO2-zXz (8), LixNi1-yCoyO2-zXz (9), LixNi1-y-zCoyMzAapproximatelya (10), LixNi1-y-zCoyMzO2-approximatelyaXapproximatelya (11), LixNi1-y-zMnyMzAapproximatelya (12), or LixNi1-y-zMnyMzO2-approximatelyaXapproximatelya (13). The sulfur based material comprises elemental sulfur, Li2Sn (nat least1), or Li2Sn (nat least1) dissolved in catholyte, an organo sulfur compound, or a carbon-sulfur polymer (C2Sx)n (where x = 2.5-50, nat least2). (In formulae 1-13)

M = Al, Ni, Co, Mn, Cr, Fe, Mg, Sr, V, or rare earth elements;

A = O, F, S, or P;

X = F, S, or P.

x is at least0.9 but at most1.1, y is at least0 but at most0.5, z is at least0 but at most0.5, alpha is at least0 but at most2.

FILE SEGMENT: CPI; EPI
MANUAL CODE: CPI: A12-E06A; L03-E01B5
EPI: X16-B01F1; X16-E01C

L34 ANSWER 3 OF 4 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2004-048610 [05] WPIX
DOC. NO. CPI: C2004-019980 [05]
DOC. NO. NON-CPI: N2004-039802 [05]
TITLE: Rechargeable **lithium** ion **battery** for elective vehicle, has acetylene black thin film portion at electrode active material application edge, which has specific **surface roughness** within preset length
DERWENT CLASS: L03; X16; X21
INVENTOR: TASAI H
PATENT ASSIGNEE: (NIST-C) JAPAN STORAGE BATTERY CO LTD
COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
JP 2003346789	A	20031205	(200405)*	JA	8[6]	

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
JP 2003346789	A	JP 2002-158248	20020530

PRIORITY APPLN. INFO: JP 2002-158248 20020530
INT. PATENT CLASSIF.:
IPC RECLASSIF.: H01M0010-04 [I,A]; H01M0010-04 [I,C]; H01M0010-36 [I,C]; H01M0010-40 [I,A]; H01M0004-02 [I,A]; H01M0004-02 [I,C]; H01M0004-62 [I,A]; H01M0004-62 [I,C]

BASIC ABSTRACT:
JP 2003346789 A UPAB: 20050527

NOVELTY - **Anode** (1a) has an active material compound material application edge which includes a thin film portion of acetylene black. The acetylene black thin film has **surface** with **roughness** of **20** microns or greater than difference of roughness elevations of portions on the film within a length of 1 mm.
USE - Rechargeable **lithium** ion **battery** for electric vehicle.
ADVANTAGE - The battery with heat radiation property and ensuring safety, is realized.
DESCRIPTION OF DRAWINGS - The figure shows a perspective view of connection structure of electric power generation component of rechargeable **lithium**-ion **battery**. (Drawing includes non-English language text). electric power-generation component (1) **anode** (1a)
cathode (1b)
current collection correction portion (2) connection unit (2a)
convex unit (2b)
terminal (3)

FILE SEGMENT: CPI; EPI
MANUAL CODE: CPI: L03-E01B5; L03-H05
EPI: X16-B01F; X16-E01E; X16-E09; X21-A01F; X21-B01A

L34 ANSWER 4 OF 4 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 1999-464210 [39] WPIX
DOC. NO. CPI: C1999-136542 [39]
DOC. NO. NON-CPI: N1999-347873 [39]
TITLE: **Polyolefin** resin material in **lithium** secondary **battery** - has **polyolefin** film separator and **anode** with specific **surface roughness** made of **polyolefin** particles or fibres
DERWENT CLASS: A17; A85; L03; X16
INVENTOR: KITAGAWA M; KOSHINA H; OKOCHI M; OURA T
PATENT ASSIGNEE: (MATU-C) MATSUSHITA DENKI SANGYO KK
COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
JP 11195410	A	19990721	(199939)*	JA	7[1]	

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
JP 11195410 A		JP 1998-304861	19981027

PRIORITY APPLN. INFO: JP 1997-293846 19971027
INT. PATENT CLASSIF.:
IPC RECLASSIF.: H01M0010-36 [I,C]; H01M0010-40 [I,A]; H01M0002-14 [I,C]; H01M0002-16 [I,A]; H01M0002-16 [I,C]; H01M0002-18 [I,A]

BASIC ABSTRACT:
JP 11195410 A UPAB: 20060115
NOVELTY - The separator (1) made of fine porous **film** of **polyolefin** type **resin** is present with a rechargeable **anode** and cathode in non-aqueous electrolyte.
Polyolefin particles or fibers with **surface roughness** of 1-**20** μm is distributed on the **anode** or at least the side touching cathode.
USE - For **lithium** secondary **battery** used in personal computer, portable telephone.
ADVANTAGE - Prevents drying of the electrolyte between electrode groups. Prevents reduction of charging and discharging life cycle. Facilitates passage of

electrolyte between the **surface roughness** and hence retention of various electrolyte. - DESCRIPTION OF DRAWING(S) - The figure shows cross sectional chart of the cylinder type **lithium** ion secondary **battery**. (1) Separator.

DOCUMENTATION ABSTRACT:

JP11195410

USE

For **lithium** secondary **battery** used in personal computer, portable telephone.

ADVANTAGE

Prevents drying of the electrolyte between electrode groups. Prevents reduction of charging and discharging life cycle. Facilitates passage of electrolyte between the **surface roughness** and hence retention of various electrolyte.

NOVELTY

The separator (1) made of fine porous **film** of **polyolefin** type **resin** is present with a rechargeable **anode** and cathode in non-aqueous electrolyte. **Polyolefin** particles or fibers with **surface roughness** of 1-20 μm is distributed on the **anode** or at least the side touching cathode.

DESCRIPTION OF DRAWING(S)

The figure shows cross sectional chart of the cylinder type **lithium** ion secondary **battery**. (1) Separator.

FILE SEGMENT: CPI; EPI
MANUAL CODE: CPI: A04-G01E; A12-E06A; A12-E06B; L03-E01A
EPI: X16-B01F1; X16-F02

=> fil hcap
FILE 'HCAPLUS' ENTERED AT 14:26:25 ON 26 APR 2007
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

FILE COVERS 1907 - 26 Apr 2007 VOL 146 ISS 18
FILE LAST UPDATED: 25 Apr 2007 (20070425/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> fil japio
FILE 'JAPIO' ENTERED AT 14:26:31 ON 26 APR 2007

FILE LAST UPDATED: 2 APR 2007 <20070402/UP>
FILE COVERS APRIL 1973 TO DECEMBER 28, 2006

>>> GRAPHIC IMAGES AVAILABLE <<<

=> fil inspec
FILE 'INSPEC' ENTERED AT 14:26:36 ON 26 APR 2007
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FILE LAST UPDATED: 23 APR 2007 <20070423/UP>
FILE COVERS 1898 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
THE ABSTRACT (/AB), BASIC INDEX (/BI) AND TITLE (/TI) FIELDS >>>

=> d 148 iall 1-11

L48 ANSWER 1 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2007:223692 HCAPLUS Full-text
DOCUMENT NUMBER: 146:255409
ENTRY DATE: Entered STN: 01 Mar 2007
TITLE: Manufacture of lithium secondary battery electrodes suppressing wrinkling on charge-discharge cycle
INVENTOR(S): Nagao, Nobuaki; Mino, Shinji; Ukaji, Masaya; Takahashi, Keiichi
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2007052960	A	20070301	JP 2005-236269	200508 17

PRIORITY APPLN. INFO.: JP 2005-236269 200508 17

PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2007052960	IPCI	H01M0004-04 [I,A]; H01M0004-66 [I,A]; H01M0004-38 [I,A]; H01M0004-48 [I,A]; H01M0004-70 [I,A]
	FTERM	5H017/AA03; 5H017/AS02; 5H017/BB08; 5H017/BB14; 5H017/CC03; 5H017/DD01; 5H017/DD05; 5H017/DD06; 5H017/EE01; 5H017/HH03; 5H050/AA07; 5H050/BA17; 5H050/CB02; 5H050/CB11; 5H050/DA03; 5H050/DA07; 5H050/DA09; 5H050/EA28; 5H050/FA04; 5H050/GA04;

5H050/GA12; 5H050/GA22; 5H050/GA25; 5H050/HA04; 5H050/HA12

ABSTRACT:
The electrodes are manufactured by coating sheet-type current collectors having plural protrusions (A) on surface, with interlayers compatible with electrolytic liqs., removing the interlayer surface to expose A partially, and arranging active mass layers on the exposed A. The current collectors may satisfy surface **roughness** Ra 1-3 μm. The electrodes have spaces for relaxation of swelling/shrinking on charge-discharge cycle and suppress wrinkle formation.

SUPPL. TERM: interlayer buried current collector battery electrode; swelling shrinking absorption space battery electrode wrinkling prevention; charge discharge cycle resistance lithium battery electrode

INDEX TERM: Carbonates, uses
Polycarbonates, uses
ROLE: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(interlayers; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: Secondary batteries
(lithium; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: Battery electrodes
(manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: Silicon alloy, **base**
ROLE: TEM (Technical or engineered material use); USES (Uses)
(active-mass **layers**; manufacture of **lithium** secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: Copper alloy, base
ROLE: TEM (Technical or engineered material use); USES (Uses)
(current collectors; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: 7440-21-3, Silicon, uses 7631-86-9, Silica, uses
ROLE: TEM (Technical or engineered material use); USES (Uses)
(active-mass layers; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

INDEX TERM: 129737-53-7, Silicon oxide (SiO0.3)
ROLE: TEM (Technical or engineered material use); USES (Uses)
(anode active mass; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from

interlayers)
INDEX TERM: 7440-50-8, Copper, uses
ROLE: TEM (Technical or engineered material use); USES (Uses)
(current collectors; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)
INDEX TERM: 105-58-8, Diethyl carbonate 21324-40-3, Lithium hexafluorophosphate
ROLE: TEM (Technical or engineered material use); USES (Uses)
(electrolytic solns.; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)
INDEX TERM: 96-49-1, Ethylene carbonate
ROLE: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(interlayers; manufacture of lithium secondary battery electrodes forming active masses on protruded current collector sections exposed from interlayers)

L48 ANSWER 2 OF 11 INSPEC (C) 2007 IET on STN
ACCESSION NUMBER: 2006:9150280 INSPEC Full-text
TITLE: High capacity and long cycle life silicon **anode** for **Li**-ion **battery**
AUTHOR: Takamura, T.; (Dept. of Appl. Chem., Harbin Inst. of Technol., China), Uehara, M.; Suzuki, J.; Sekine, K.; Tamura, K.
SOURCE: Journal of Power Sources (25 Aug. 2006), vol.158, no.2, p. 1401-4, 17 refs.
CODEN: JPSODZ, ISSN: 0378-7753
SICI: 0378-7753(20060825)158:2L.1401:HCLC;1-P
Doc.No.: S0378-7753(05)01470-9
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English
ABSTRACT: A silicon film was deposited on a Ni or Cu foil in vacuum up to a thickness of 4μm and the Li insertion/extraction behaviour was evaluated under constant current charge/discharge in an electrolyte solution of propylene carbonate containing 1M LiClO4. The surface of a 30μm thick Ni foil was roughened by etching with FeCl3. The Li insertion/extraction performance was strongly dependent on the roughness factor. A thick silicon film is necessary for practical application. However, the cycle performance as well as the Li accommodation capacity was markedly depressed when the film thickness was increased. We found that the **roughening** of the **substrate surface** was a key factor for attaining good performance with a thick film. **Surface roughening** was found to be very effective, but the best performance was obtained by the use of an electrolytically deposited Cu foil on which a silicon film was vacuum-deposited rapidly. [All rights reserved Elsevier]
CLASSIFICATION CODE: A8630F Secondary cells; A8245 Electrochemistry and electrophoresis; A6820 Solid surface structure; A6855 Thin film growth, structure, and epitaxy; A8115L Deposition from liquid phases (melts and solutions); B8410E Secondary

cells
CONTROLLED TERM: **anodes**; electrochemical electrodes; electrodeposition; electrodeposits; electrolytes; lithium; secondary cells; silicon; substrates; **surface roughness** ; thick films
SUPPLEMENTARY TERM: long cycle life silicon anode; lithium-ion battery; lithium insertion; lithium extraction; electrolyte solution; propylene carbonate; thick silicon film; substrate surface; surface roughening; 4 mum; 30 mum; Li; Ni; Cu; Si
CHEMICAL INDEXING: Li int, Li el; Ni sur, Ni el; Cu sur, Cu el; Si el
PHYSICAL PROPERTIES: size 4.0E-06 m; size 3.0E-05 m
ELEMENT TERMS: Li; Ni; Cu; Cl*Li*O; LiClO4; Li cp; cp; Cl cp; O cp; Cl*Fe; FeCl3; Fe cp

L48 ANSWER 3 OF 11 INSPEC (C) 2007 IET on STN
ACCESSION NUMBER: 2003:7730869 INSPEC Full-text
DOCUMENT NUMBER: A2003-20-6820-018; B2003-10-0550-010
TITLE: Effect of poly(vinylidene fluoride) binder crystallinity and graphite structure on the mechanical strength of the composite **anode** in a **lithium** ion **battery**
AUTHOR: Mikyong Yoo; Frank, C.W.; (Dept. of Mater. Sci. & Eng., Stanford Univ., CA, USA), Mori, S.; Yamaguchi, S.
SOURCE: Polymer (July 2003), vol.44, no.15, p. 4197-204, 30 refs.
CODEN: POLMAG, ISSN: 0032-3861
SICI: 0032-3861(200307)44:15L.4197:EPVF;1-8
Price: 0032-3861/03/$30.00
Published by: Elsevier, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Application; Practical; Experimental
COUNTRY: United Kingdom
LANGUAGE: English
ABSTRACT: We have evaluated the mechanical strength of a series of composites consisting of carbon particles bound together by poly(vinylidene fluoride) (PVDF), which is closely related to the carbonaceous **anode** in a **lithium** ion **battery**. We used a balanced beam scrape adhesion tester and evaluated the influence of carbon particle structure, the chemical properties of PVDF, and the processing parameters of annealing temperature and casting solvent on the adhesion of the composite film to a copper substrate. The composite prepared with amorphous carbon shows over 10 times higher adhesion strength than those fabricated from other graphite materials. This results from chemical binding that is intermediate between semi-ionic and covalent C-F bonds, as detected by X-ray photoelectron spectroscopy. To address the effect of the crystalline phase of the binder on the adhesion strength, we investigated PVDF crystallinity in the composite films using differential scanning calorimetry. Samples with higher crystallinity show higher adhesion strength, independent of annealing temperature and casting solvent. The scratch adhesion was also measured for swollen electrodes immersed in 3:7 volume ratio of ethylene carbonate:ethyl methyl carbonate (EC:EMC) at different temperatures. After being swollen, the composite films prepared from PVDF modified with hydroxyl functional groups show higher adhesion strengths than the others due to their low uptake of the electrolyte solvent CLASSIFICATION CODE: A6820 Solid surface structure; A8630F Secondary cells; A6165 Crystal structure of specific organic compounds; A8190 Other topics in materials science; A6150L Crystal binding;

A7960G Photoelectron spectra of composite surfaces; A8280P Electron spectroscopy for chemical analysis (photoelectron, Auger spectroscopy, etc.); A8140E Cold working, work hardening; post-deformation annealing, recovery and recrystallisation; textures; A8265 Surface chemistry; A6140K Structure of polymers, elastomers, and plastics; A8120T Preparation of reinforced polymers and polymer-based composites; A8245 Electrochemistry and electrophoresis; B0550 Composite materials (engineering materials science); B8410E Secondary cells

CONTROLLED TERM: adhesion; amorphous state; annealing; bonds (chemical); casting; crystal structure; differential scanning calorimetry; electrochemical electrodes; electrochemistry; filled polymers; graphite; mechanical strength; particle reinforced composites; **polymer films**; polymer structure; polymers; **rough surfaces**; secondary cells; surface chemistry; surface topography; X-ray photoelectron spectra

SUPPLEMENTARY TERM: poly(vinylidene fluoride) binder crystallinity effects; graphite structure; mechanical strength; composite anode; lithium ion battery; carbon particles; carbonaceous anode; balanced beam scrape adhesion tester; carbon particle structure; chemical properties; annealing temperature; casting solvent; composite film; copper substrate; amorphous carbon; adhesion strength; graphite materials; chemical binding; semiionic bonds; covalent C-F bonds; X-ray photoelectron spectroscopy; crystalline phase; crystallinity; differential scanning calorimetry; scratch adhesion; swollen electrodes; ethylene carbonate-ethyl methyl carbonate; hydroxyl functional groups; electrolyte solvent; surface chemistry; film surface; C

CHEMICAL INDEXING: C el

ELEMENT TERMS: C*F; C-F

L48 ANSWER 4 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:812138 HCAPLUS Full-text

DOCUMENT NUMBER: 137:339939

ENTRY DATE: Entered STN: 25 Oct 2002

TITLE: Secondary lithium battery anode and the battery

INVENTOR(S): Fujimoto, Hiroyuki; Mita, Hiroko; Okamoto, Takashi; Fujiwara, Toyoki; Iyori, Masahiro; Kamino, Maruo

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

INT. PATENT CLASSIF.:
MAIN: H01M004-02
SECONDARY: H01M004-64; H01M004-70; H01M010-40

CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal

Energy Technology)
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002313319	A	20021025	JP 2001-110149	200104 09
US 2004224231	A1	20041111	US 2002-118309	200204 09
US 6887623	B2	20050503		
PRIORITY APPLN. INFO.:			JP 2001-110149 A	200104 09
			JP 2001-121172 A	200104 19

PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002313319	ICM	H01M004-02
	ICS	H01M004-64; H01M004-70; H01M010-40
	IPCI	H01M0004-02 [ICM,7]; H01M0004-64 [ICS,7]; H01M0004-70 [ICS,7]; H01M0010-40 [ICS,7]; H01M0010-36 [ICS,7,C*]
	IPCR	H01M0004-64 [I,C*]; H01M0004-64 [I,A]; H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-70 [I,C*]; H01M0004-70 [I,A]; H01M0010-36 [I,C*]; H01M0010-40 [I,A]
US 2004224231	IPCI	H01M0004-40 [ICM,7]; H01M0004-66 [ICS,7]; H01M0004-80 [ICS,7]; H01M0004-70 [ICS,7]
	IPCR	H01M0004-40 [I,C*]; H01M0004-40 [I,A]; H01M0004-62 [I,C*]; H01M0004-62 [I,A]; H01M0004-66 [I,C*]; H01M0004-66 [I,A]; H01M0004-70 [I,C*]; H01M0004-70 [I,A]; H01M0004-80 [I,A]
	NCL	429/232.000; 429/231.950; 429/235.000; 429/237.000; 429/245.000

ABSTRACT:
The anode has a thin **Li**-intercalating active mass **layer** deposited on a **current collector** having a corrugated surface; where the active mass layer in its thickness direction has gaps among concavities of the collector surface. Preferable, the gap width is ≤10 um, the active mass layer is an amorphous silicon film and the collector is formed by depositing metal particles on a **rough** surface treated metal foil. The battery has the above anode, a cathode and a nonaq. electrolyte.

SUPPL. TERM: secondary lithium battery silicon anode active mass gap structure
INDEX TERM: Battery anodes
(Anodes containing Si films with small gaps deposited on Cu collectors for secondary lithium batteries)
INDEX TERM: 7440-50-8, Copper, uses
ROLE: DEV (Device component use); USES (Uses)

(Anodes containing Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

INDEX TERM: 7440-21-3, Silicon, uses
ROLE: DEV (Device component use); USES (Uses)
(anodes containing Si films with small gaps deposited on Cu collectors for secondary lithium batteries)

L48 ANSWER 5 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2002:447278 HCAPLUS Full-text
DOCUMENT NUMBER: 137:8657
ENTRY DATE: Entered STN: 14 Jun 2002
TITLE: Manufacture of anode for secondary lithium battery
INVENTOR(S): Okano, Hiroshi; Yagi, Hiromasa
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: H01M004-04
SECONDARY: H01M004-38; H01M004-66; H01M004-02; H01M010-40
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
JP 2002170554	A	20020614	JP 2000-366876		20001201
US 2002102348	A1	20020801	US 2001-995863		20011129
US 6815003	B2	20041109			
PRIORITY APPLN. INFO.:			JP 2000-366876	A	20001201
			JP 2001-8692	A	20010117

PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2002170554	ICM	H01M004-04
	ICS	H01M004-38; H01M004-66; H01M004-02; H01M010-40
	IPCI	H01M0004-04 [ICM,7]; H01M0004-38 [ICS,7]; H01M0004-66 [ICS,7]; H01M0004-02 [ICS,7]; H01M0010-40 [ICS,7]; H01M0010-36 [ICS,7,C*]
	IPCR	H01M0004-66 [I,C*]; H01M0004-66 [I,A]; H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0004-04 [I,C*]; H01M0004-04 [I,A]; H01M0004-38 [I,C*]; H01M0004-38 [I,A]; H01M0010-36 [I,C*]; H01M0010-40 [I,A]
US 2002102348	IPCI	B05D0005-12 [ICM,7]; H01M0004-58 [ICS,7]
	IPCR	B05D0005-12 [I,A]; B05D0005-12 [I,C*];

C23C0014-32 [I,A]; C23C0014-32 [I,C*];
H01M0004-58 [I,A]; H01M0004-58 [I,C*];
H01M0006-00 [I,A]; H01M0006-00 [I,C*]
NCL 427/058.000; 429/231.950
ECLA H01M004/02B; H01M004/04W; H01M004/38; H01M004/70

ABSTRACT:
The anode is prepared by wet etching a metal foil to form a **rough** ***surface*** , and depositing a **Li** intercalating active mass ***layer*** on the **roughened surface**. The metal foil may be a Ni foil, and may have an intermediate Cu layer on the ***roughened*** surface; and the active mass is selected from amorphous and microcryst. Si, Ge, and Si-Ge alloy.

SUPPL. TERM: secondary lithium battery anode manuf substrate surface **roughening**; nickel substrate surface **roughening** lithium battery anode

INDEX TERM: Battery anodes
(manufacture of silicon and germanium anodes with copper coated wet etched nickel substrates for secondary lithium batteries)

INDEX TERM: 7440-21-3, Silicon, uses 7440-50-8, Copper, uses 7440-56-4, Germanium, uses 11148-21-3
ROLE: DEV (Device component use); USES (Uses)
(manufacture of silicon and germanium anodes with copper coated wet etched nickel substrates for secondary lithium batteries)

INDEX TERM: 7440-02-0, Nickel, uses
ROLE: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(wet etching of metal foil substrates in silicon and germanium anode manufacture for secondary lithium batteries)

L48 ANSWER 6 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2000:855674 HCAPLUS Full-text
DOCUMENT NUMBER: 134:20627
ENTRY DATE: Entered STN: 07 Dec 2000
TITLE: Article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids
INVENTOR(S): Coffinberry, George A.
PATENT ASSIGNEE(S): General Electric Company, USA
SOURCE: U.S., 7 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
INT. PATENT CLASSIF.:
MAIN: B32B017-00
US PATENT CLASSIF.: 428469000
CLASSIFICATION: 57-8 (Ceramics)
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6156439	A	20001205	US 1997-955043	199710 21

PRIORITY APPLN. INFO.: US 1997-29082P P 199710 23

PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6156439	ICM	B32B017-00
	INCL	428469000
	IPCI	B32B0017-00 [ICM,7]
	IPCR	C23C0016-06 [I,C*]; C23C0016-06 [I,A]; C23C0016-26 [I,C*]; C23C0016-26 [I,A]; C23C0016-40 [I,C*]; C23C0016-40 [I,A]
	NCL	428/469.000; 427/327.000; 427/375.000; 428/408.000; 428/472.000; 428/688.000

ABSTRACT:
The article comprises a wall and a coating on the wall, where the coating has a smooth surface and protects the wall from chemical attack by constituents of a hydrocarbon fluid. The coating comprises a surface layer that contains ≥1 materials that reduce the tendency for H atoms in the hydrocarbon fluid to covalently bond with atoms in the surface layer, where the materials are metal and metal-metal compds. of Al, Au, the Group 1A elements and their combinations, diamond-like compds., and compds. consisting of electroneg. atoms tied up with C atoms. Preferably, the coating further comprises an amorphous metal oxide diffusion barrier sublayer beneath the surface layer; the coating has a surface **roughness** of ≤16 micro-inches; the surface of the wall is oxide-free; and the surface layer is deposited by CVD.

SUPPL. TERM: coating surface prevention deposit hydrocarbon fluid; diamondlike material coating prevention deposit; lithium sodium potassium coating prevention deposit; rubidium francium aluminum gold coating prevention deposit; tantala silica coating prevention deposit

INDEX TERM: Coating materials
(article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)

INDEX TERM: Hydrocarbons, miscellaneous
ROLE: MSC (Miscellaneous)
(article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)

INDEX TERM: Diamond-type crystals
(coating containing; article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)

INDEX TERM: Coke
ROLE: REM (Removal or disposal); PROC (Process)
(coke deposit; article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)

INDEX TERM: Resins
ROLE: REM (Removal or disposal); PROC (Process)
(gum deposit; article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)

INDEX TERM: 1314-61-0, Tantala 7631-86-9, Silica, processes
ROLE: PEP (Physical, engineering or chemical process); PROC (Process)
(sublayer containing; article with coating for preventing formation of deposits on surfaces

contacting hydrocarbon fluids)
INDEX TERM: 7429-90-5, Aluminum, processes 7439-93-2, **Lithium**, processes 7440-09-7, Potassium, processes 7440-17-7, Rubidium, processes 7440-23-5, Sodium, processes 7440-57-5, Gold, processes 7440-73-5, Francium, processes
ROLE: PEP (Physical, engineering or chemical process); PROC (Process)
(**surface layer** containing; article with coating for preventing formation of deposits on surfaces contacting hydrocarbon fluids)
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD.
REFERENCE(S):
(1) Baker; US 4343658 1982 HCAPLUS
(2) Christl; US 4078604 1978 HCAPLUS
(3) Coffinberry; US 5805973 1998 HCAPLUS
(4) Dille; US 2959915 1960 HCAPLUS
(5) Edwards; US 5240741 1993
(6) Edwards; US 5264244 1993 HCAPLUS
(7) Edwards; US 5266360 1993 HCAPLUS
(8) Edwards; US 5269137 1993
(9) Foster; US 4297150 1981 HCAPLUS
(10) Jo; US 5567305 1996
(11) Konoki; US 4444732 1984 HCAPLUS
(12) Schirmer; US 2698512 1955 HCAPLUS
(13) Smith; US 3173247 1965 HCAPLUS
(14) Spence; US 5324544 1994 HCAPLUS
(15) Spence; US 5336560 1994 HCAPLUS
(16) Tong; US 5360531 1994 HCAPLUS

L48 ANSWER 7 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 1999:465164 HCAPLUS Full-text
DOCUMENT NUMBER: 131:202131
ENTRY DATE: Entered STN: 29 Jul 1999
TITLE: LiCoO2 and LiCo1-xAlxO2 thin film cathodes grown by pulsed laser ablation
AUTHOR(S): Perkins, J. D.; Bahn, C. S.; Parilla, P. A.; McGraw, J. M.; Fu, M. L.; Duncan, M.; Yu, H.; Ginley, D. S.
CORPORATE SOURCE: National Renewable Energy Laboratory, Golden, CO, USA
SOURCE: Journal of Power Sources (1999), 81-82, 675-679
CODEN: JPSODZ; ISSN: 0378-7753
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ABSTRACT:
LiCoO2 and LiCo0.5Al0.5O2 thin films have been grown by pulsed laser ablation on SnO2-coated glass substrates. For both stoichiometries, the resultant films are dense and uniaxially textured films with the ***Li*** and Co **layers** parallel to the **substrate**. In general, to grow LiCo0.5Al0.5O2 films, a laser flux .apprx.80 mJ/pulse higher than that used for LiCoO2 films is required to achieve a similar deposition rate. LiCoO2 films grown at 600° and oxygen pressure 2000 mtorr have a typical grain size of .apprx.100 nm. For constant current cycling between 3.8 and 4.2 V at 5 μA, the LiCoO2 films have an initial discharge capacity of .apprx.0.33 Li/LiCoO2 (89 mA-h/g) decreasing to .apprx.0.18 Li/LiCoO2 (49 mA-h/g) after 100 cycles and have

a continued capacity loss of .apprx.0.25% per cycle. The LiCo0.5Al0.5O2 films grown to date have **roughly** 3 times less capacity than the LiCoO2 films and apparently a large asymmetry between Li extraction and reintercalation.

SUPPL. TERM: aluminum lithium cobalt oxide cathode pulsed laser ablation; battery lithium cobalt oxide cathode

INDEX TERM: Battery cathodes
(growth of cobalt lithium oxide and aluminum cobalt lithium oxide thin-film cathodes for batteries by pulsed laser ablation)

INDEX TERM: Laser ablation
(pulsed; growth of cobalt lithium oxide and aluminum cobalt lithium oxide thin-film cathodes for batteries by pulsed laser ablation)

INDEX TERM: 12190-79-3, Cobalt lithium oxide (CoLiO2)
199923-78-9, Aluminum cobalt lithium oxide (Al0.5Co0.5LiO2)
ROLE: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(growth of cobalt lithium oxide and aluminum cobalt lithium oxide thin-film cathodes for batteries by pulsed laser ablation)

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD.

REFERENCE(S):

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(2) Amatucci, G; Solid State Ionics 1996, V83, P167 HCAPLUS
(3) Antaya, M; J Appl Phys 1994, V76, P2799 HCAPLUS
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L48 ANSWER 8 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 1992:91860 HCAPLUS Full-text
DOCUMENT NUMBER: 116:91860
ENTRY DATE: Entered STN: 06 Mar 1992
TITLE: Quantum size effects in equilibrium lithium ultrathin layers
AUTHOR(S): Boettger, J. C.; Trickey, S. B.

CORPORATE SOURCE: Theor. Div., Los Alamos Natl. Lab., Los Alamos, NM, 87545, USA
SOURCE: Physical Review B: Condensed Matter and Materials Physics (1992), 45(3), 1363-72
CODEN: PRBMDO; ISSN: 0163-1829
DOCUMENT TYPE: Journal
LANGUAGE: English
CLASSIFICATION: 65-5 (General Physical Chemistry)
Section cross-reference(s): 66, 75

ABSTRACT:
The existence and extent of quantum size effects in simple metal ultrathin films are studied by a systematic local-d., all-electron, full-potential calcn. of the cohesive properties of ν layers of hexagonal Li, with ν = 1, 2, 3, 4, and 5. By ν = 5, there is clear convergence of the a lattice parameter (intraplanar bond length) to very nearly the calculated crystalline value, with a distinction between the two films with a meaningful interior (a = 5.68 ± 0.01 a.u. for ν = 4 and 5) and those with a minimal interior or none at all (ν = 3 and ν = 1 and 2, resp.; a = 5.75-0.01+0.02 a.u.). Equally clear stability of the interplanar spacings occur at distinctly noncryst. values (4.27 a.u. for ν = 2; 4.38 ± 0.01 a.u. for the inner spacing of ν = 3, 4, and 5 vs. 4.64 a.u. for the crystalline calcn.). The cohesive energies of the 3, 4, and 5 layers are closely clumped at about 87% of the crystalline value. As the 2 and 1 layers are substantially less bound, both the cohesive properties and the inner interplanar spacing suggest a different grouping than suggested by the a lattice parameter. **Rough** extrapolation of the slowly increasing cohesion with ν suggests that ν ≈ 20 would be needed to achieve even 90% of the crystalline cohesive energy. The calculated surface energies do not exhibit any strong size effect, in striking contrast to Al films. The equilibrium intraplanar force constant a2E/da2 has a min. at ν = 3, with its maximum at ν = 5 almost 2.5 times larger. The calculated work functions give only a hint, at the very most, of the quantum size oscillations predicted from jellium models. A significant quantum size effect occurs, however, in the occupied portion of the d. of states, which exhibits a step-function increase for each integer increase in ν. The d. of states at EF has a maximum at ν = 3 with a variation over the series of about 10%. The unrelaxed films do not exhibit a stronger quantum size effect than the equilibrium films, again with the barely possible exception of the work function.

SUPPL. TERM: quantum size effect lithium ultrathin layer; density state size lithium ultrathin layer; cohesive energy size lithium ultrathin layer; work function size lithium ultrathin layer; **surface** energy size **lithium** ultrathin **layer**; force const size lithium ultrathin layer
INDEX TERM: Crystal structure
Surface energy
Work function
(of **lithium** ultrathin **layers**, quantum size effect on)
INDEX TERM: Energy
(cohesive, of lithium ultrathin layers, quantum size effect on)
INDEX TERM: Energy level, band structure
(d. of states, of lithium ultrathin layers, quantum size effect on)
INDEX TERM: Force constant
(interlayer, of lithium ultrathin layers, quantum

size effects on)
INDEX TERM: 7439-93-2, Lithium, properties
ROLE: PRP (Properties)
(quantum size effects in equilibrium ultrathin layers of)

L48 ANSWER 9 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 1992:110111 HCAPLUS Full-text
DOCUMENT NUMBER: 116:110111
ENTRY DATE: Entered STN: 20 Mar 1992
TITLE: Cylindrical organic-electrolyte batteries
INVENTOR(S): Inui, Takeshi; Oo, Fumio
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
INT. PATENT CLASSIF.:
MAIN: H01M006-16
SECONDARY: H01M004-02
CLASSIFICATION: 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 03245465	A	19911101	JP 1990-41780	199002 22
PRIORITY APPLN. INFO.:			JP 1990-41780	199002 22

PATENT CLASSIFICATION CODES:

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 03245465	ICM	H01M006-16
	ICS	H01M004-02
	IPCI	H01M0006-16 [ICM,5]; H01M0004-02 [ICS,5]
	IPCR	H01M0004-02 [I,C*]; H01M0004-02 [I,A]; H01M0006-16 [I,C*]; H01M0006-16 [I,A]

ABSTRACT:
The batteries use light metal **anodes** having **roughened** ***surface*** , preferably **30**-60% of total **anode** ***surface*** area. The use of these **anodes** prevents short circuiting in the batteries.

SUPPL. TERM: **battery lithium anode**
surface roughened
INDEX TERM: **Batteries**, primary
(**lithium**/manganese dioxide, cylindrical, short circuit prevention in)
INDEX TERM: **Anodes**
(**battery, lithium, surface-roughened**, for short circuit prevention)
INDEX TERM: 7439-93-2, Lithium, uses
ROLE: USES (Uses)

(**anodes, surface-roughened,** for preventing short circuit in batteries)

L48 ANSWER 10 OF 11 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 2004-146348 JAPIO Full-text
TITLE: **NEGATIVE ELECTRODE** FOR **LITHIUM** SECONDARY **BATTERY**, AND THE **LITHIUM** SECONDARY **BATTERY** CONTAINING SAME
INVENTOR: LEE JAE-WOAN; CHO CHUNG-KUN
PATENT ASSIGNEE(S): SAMSUNG SDI CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2004146348	A	20040520	Heisei	H01M004-66

APPLICATION INFORMATION
STN FORMAT: JP 2003-164281 20030609
ORIGINAL: JP2003164281 Heisei
PRIORITY APPLN. INFO.: KR 2002-200265483 20021025
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2004
INT. PATENT CLASSIF.:
MAIN: H01M004-66
SECONDARY: H01M002-16; H01M004-02; H01M004-04; H01M004-58; H01M004-60; H01M004-64; H01M010-36; H01M010-40

ABSTRACT:
PROBLEM TO BE SOLVED: To provide a **negative electrode** for a **lithium** secondary **battery** having superior life time characteristics and a **lithium** secondary **battery** containing the same. SOLUTION: The **negative electrode** for the **lithium** secondary **battery** contains a base material, having an average **surface roughness** of 30 Å to 4,000 Å and a lithium layer coated on the base material. The **lithium** secondary **battery** containing the **negative electrode** is superior in the life time characteristics.
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L48 ANSWER 11 OF 11 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 2001-210330 JAPIO Full-text
TITLE: **LITHIUM** SECONDARY **BATTERY**
INVENTOR: HARA KENJI; TAKATSUKA YUICHI; HIGASHIMOTO KOJI; HIRONAKA KENSUKE
PATENT ASSIGNEE(S): SHIN KOBE ELECTRIC MACH CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2001210330	A	20010803	Heisei	H01M004-64

APPLICATION INFORMATION
STN FORMAT: JP 2000-15208 20000125
ORIGINAL: JP2000015208 Heisei
PRIORITY APPLN. INFO.: JP 2000-15208 20000125
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
INT. PATENT CLASSIF.:
MAIN: H01M004-64
SECONDARY: H01M004-02; H01M010-40

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a long life **lithium** secondary **battery** which has a high capacity/high output/no failure such as a short circuit or the like between a positive **electrode/negative electrode** even with the time lapse.

SOLUTION: A slurry which has been mixed of amorphous carbon and binder at the predetermined rate is coated on both sides of rolled copper foil at the **surface roughness** of (Ra) 0. **20**, and at the thickness of 10 μm, and the **negative electrode** plate is pressed while a linear pressure of roll press machine is made as 3.9×103 N/cm, a vent pressure as 3.0×106 Pa, and the thickness of coated part of **negative electrode** after the press is made as 60 μm, and the bulk density of **negative electrode** is made as 1.00 g/cm3. The bulk density of **negative electrode** mixture can be made larger, and even if the winding is made via the positive electrode plate and separator, the facing has no discrepancy, and a short circuit does not occur. COPYRIGHT: (C)2001,JPO

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